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James Annesley of Madras Medical Service (1800–1838) on cholera in Madras Presidency in 1825

Ramya Raman and Anantanarayanan Raman

James Annesley from Ireland spent nearly four decades in Madras, first as an assistant and later as a senior surgeon attached to the Madras Medical Establishment. During this span of service he published the book in 1825 on the most prevalent diseases of India comprising a treatise on the epidemic cholera of the East. This paper recounts the epidemiology of cholera and the efforts made to manage it in the Madras Presidency in the 1820s, keeping in view the life of Annesley and the contents of his book.

As ever you come of women, come in quickly to Sir John.
Ah, poor heart! He is so shak'd of a burning quotidian tertian that it is most lamentable to behold. Sweet men, come to him.

William Shakespeare
King Henry V, Act II, Scene I
(words of Hostess to Corporal Nym).

'How do humans live in tropical landscapes that generally experience high intensities of warm temperature?' was one question that usually concerned several British medical personnel in the early decades of the 19th century. Seeking answer to this question¹ and also to earn large sums of money (note 1), many English, Scottish and Irish medical doctors came to India to work with the English East-India Company (EEIC). Several of them went to other tropical British colonies, such as the Bahamas and Jamaica. Most of them wrote books sharing their experiences in those tropical nations. James Annesley came to India from Ireland to serve in the Madras Medical Service of the EEIC. He wrote a few books on tropical diseases in general, based on his long innings as a junior and senior surgeon. The following announcement occurs in the *London Medical and Physical Journal*, edited by Roderick MacLeod (1825, 54, 523):

'Sketches of the most prevalent Diseases of India; comprising a Treatise on the Epidemic Cholera of the East; Statistical and Topographical Reports of the Diseases in the different Divisions of the Army, under the Madras Presidency: embracing also the annual Rate of Mortality, &c. of European Troops, and practical Observations on the Effects of Calomel on the Alimentary Canal, and on the

Diseases most prevalent in India. Illustrated by Tables and Plates. By James Annesley Esq. Madras Medical Establishment; lately in charge of the General Hospital, Madras, and Garrison-Surgeon to Fort St. George. – London, 1825.'

Thomas and George Underwood, London, published this book by Annesley in 1825 (Figure 1).

Cholera was considered the classic epidemic disease of the 19th century². The disease, strongly implicated to have originated in the Indian subcontinent, spread to parts of Europe and USA in the 19th century, triggering people's unrest and consequent riots, which prompted the local municipal administrators to implement measures of better administration and public hygiene, thus controlling cholera, eventually³. In contrast, David

Arnold's⁴ (pp. 118, 119) remark on the cholera epidemic in India in the 19th century provides a panoramic perspective of the intensity of the disease and its fatal effects on the one hand, and its social-historical implications on the people of India on the other:

'...even though the sub-continent was the source of the cholera pandemics and itself suffered millions of deaths from the disease during the nineteenth and early twentieth centuries. This silence might seem to indicate that because cholera was native to India it generated none of the strong reactions that marked its appearance in the west and that, whatever was its demographic impact, it was of marginal political and social significance. ... Cholera provides a convenient point of entry for the study of mentality as well as the material conditions of India's subordinate classes, while also illustrating the interventionist capacity of the colonial state and the political constraints that acted upon it.'

Keeping the above context in full view, this paper highlights the work of Annesley in the understanding of the science of cholera during his medical career in the Madras Presidency.

James Annesley

James Annesley (JA, Portrait 1) was born in 1774 to Marcus Annesley of County Down, Ireland. He studied at Trinity College and the Company of Surgeons (CoS) (note 2). In 1795, JA earned his Membership of the CoS (modern equivalent being 'Member of the Royal College of Surgeons', M.R.C.S.). In 1799, he was selected for medical service of the EEIC.

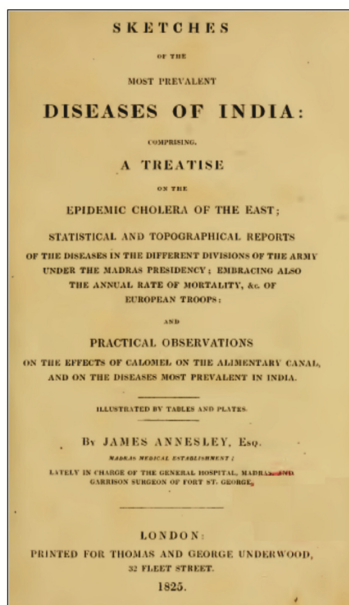


Figure 1. Cover of Annesley's book (1825; public domain).

He arrived in India in December 1800. He was appointed as an assistant surgeon in the Native-Infantry Battalion, Trichinopoly Corps (Tiruchirappalli, 10°48'N, 78°41'E). Between 1802 and 1805, he served in different towns of the Madras Presidency.

In 1806, JA was posted as the Garrison Surgeon at Masulipatnam (16°17'N, 81°13'E). Here he got to see and treat patients suffering from various infectious diseases of tropical India. He meticulously recorded the disease history and other pertinent details of every patient, noting symptoms, medications used and treatment outcomes. In 1811, he was appointed as the Superintendent of a field hospital established by the Government of Madras for native troops, which functioned as a part of the Java Expedition launched by the British (for details of the Expedition, please see William James, 1847, *The Naval History of Great Britain, from the Declaration of War by Trace in 1793, to the Accession of George IV*, vol. IV, Richard Bentley, London, UK). He became so popular among the native soldiers, who were to be recruited for overseas service and those belonging to the 'Madras Regiment' (note 3), that they readily volunteered for service in any part of the world. In 1812, JA joined the Madras European Regiment (note 4) and remained with it until 1817. He was promoted as the Superintending Surgeon to the advanced divisions of the army and served there until the end of 1818. His role as a Superintending Surgeon is consistently cited in different records for his zeal and skills. In 1818, JA was appointed Garrison Surgeon at Fort St. George, Madras. He held additional

charge as the Superintendent of the Madras General Hospital, until he returned to Britain in 1824. On leaving Madras back to England, he was bade farewell with a plate worth 100 guineas (note 5).

JA was invited to return to Madras in 1829 on an assignment to examine the medical records of previous years on the dictate from the Government of Madras that he should explore the patterns of different infectious diseases then rampant in the Madras Presidency. He analysed the archived records from 1788 to 1829. He linked the climate data of Madras Presidency to disease epidemiology. His report consisted of 12 volumes, accompanied by 4 supplementary volumes, which pertained to medical observations. These volumes are of considerable interest even today. He was appointed a member of the Madras Medical Board in 1833 and served the Board for the next five years. He served in the Madras Presidency for 38 years, barring a few months of leave of absence. He was elected to the Fellowship of the Royal Society in 1840 and the Royal College of Surgeons of Ireland in 1844. He was knighted in 1844. He was also a Fellow of the Society of Antiquaries. He died in Florence, Italy in 1847.

JA's publications include *Sketches of the Most Prevalent Diseases of India...*⁶, *Treatment of Prevalent Diseases of India*, 1825; and the multi-volume *Digest of Madras Medical Reports 1788–1829*. The section on 'cholera' from the *Sketches of the Most Prevalent Diseases of India...*⁶ was translated into German by Surgeon Karl Gustav Himly in 1831 under the title *Über die Ostindische Cholera, nach vielen eigenen Beobachtungen und Leichenöffnungen von James Annesley (On the East-Indian Cholera, Supplemented with Several Notes by and Autopsies made by James Annesley; Verlage der Helwingschen Hof-Buchhandlung; presently, Helwingsche Buchhandlung, Hannover, p. 254)*.

An 18-page biography of JA by Thomas Joseph Pettigrew⁵ is available. JA's interest in tropical diseases seems to have blossomed when he was posted as the Garrison Surgeon in Masulipatnam in 1805–1810. The words of Pettigrew⁵ (p. 2) quoted below summarize JA's passion to the profession and his interest in tropical diseases and their management, especially during his term as the Garrison Surgeon.

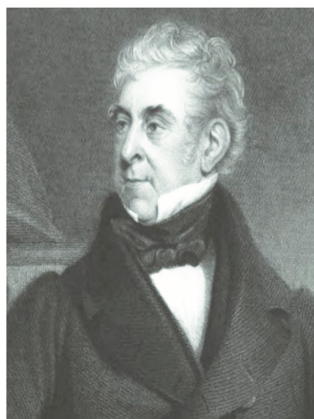
'It may be remarked as an instance of extraordinary zeal in his professions, that, from that period to the present time, he has never treated a case, either in public hospitals or in private practice, without recording minutely the symptoms of the disease, the remedies employed, and the results of the application. His attention has always been particularly directed to the effects and the operation of medicines, with reference to particular symptoms and, in the event of casualties, the *post mortem* appearances have been looked to, with reference to both to the symptoms of the disease, and the remedies used.'

His nearly four decades of stay in Madras, dealing with patients suffering diverse infectious, tropical illnesses empowered him to get deeply interested into understanding tropical diseases, interpreting them and suggest effective treatment and management tactics.

Annesley's Sketches of the Most Prevalent Diseases of India...⁶

This 464-page book is presented in three parts: (1) On the epidemic cholera of India, (2) Reports of diseases of the army under the Madras Presidency, and (3) Practical observation on the effects of calomel on the mucous surface of the alimentary canal; and on its use in the diseases of India. Each part is divided into chapters, and chapters into sections. For example, chapter 2 (pp. 16–44) entitled 'Of the symptoms and progress of the epidemic cholera' in part 1 (pp. 3–250) is further classified into four sections: (1) 'Description of the symptoms of epidemic cholera' (pp. 17–21), (2) 'Of the early symptoms of the epidemic cholera, or the symptoms of the stage of invasion' (pp. 22–30), (3) 'Symptoms of the second, or advanced stage of the epidemic cholera' (pp. 31–55), and (4) 'Of the pathognomonic, diagnostic, and prognostic symptoms of epidemic cholera' (pp. 36–44).

The context for JA's volume is based on his experience of treating several patients who suffered cholera, which broke out in the Madras Presidency in epidemic proportions in 1819–23, particularly when he was at Fort St. George, Madras, holding additional charge as Superintendent of the Madras General Hospital. His



Portrait 1. James Annesley (Source: Pettigrew⁵; public domain).

responsibility included examining those who had died of cholera as well. JA strongly believed that a *post-mortem* examination 'should never be omitted where any doubt exists of the real nature of the disease'⁶ (p. xvi).

JA was deeply committed to the theory that the sporadic form of cholera is one that was influenced by the climate of India. The principal evidence he used to reach the above conclusion was that cholera occurs endemically in certain districts (he does not name them) during certain seasons of the year. JA distinguished the epidemic 'India cholera' from 'cholera morbus'⁷. Rawlings⁸ explained cholera morbus (which we know today as a gastrointestinal illness characterized by cramps, diarrhoea and occasional vomiting⁹) as a 'summer complaint' caused by food contaminated by gastrointestinal pathogens usually manifesting in older children and adults between July and September. JA provided a list of diagnostic features and those of pathognomonic kind. Slight nausea and laxity of the bowels, he indicated as the second stage of the disease. This stage quickly transforms into intense diarrhoea and rigorous vomiting, what he described as the third stage when the patients usually seek medical help. A burning sensation between the scrobiculus cordis (the depression spot in the epigastric region) and the umbilicus was determined by JA as a significant early symptom of the disease. Based on *post-mortem* examinations of many cholera-induced deaths in India, he suggested that epidemic cholera is an affection of the nervous system, which progressively alters its functions. More importantly, he derived the changes in the blood profile as a consequence of failure of the nervous system. He believed that venous congestion is one common outcome of cholera for which he suggested bleeding to relieve the heart and lungs from oppression. During phlebotomy, JA recommended not relying on the quantity of blood extracted, but on the quality, i.e. until the extracted blood was bright red. He looked upon bleeding as 'the sheet anchor in the treatment of epidemic cholera'. He recommended the use of camphor, ammonia and æther in preference over opium, the last item having an influence on the brain. He vividly spoke on the use of calomel as a critical remedial component in treating patients suffering epidemic cholera.

Calomel, a mercurial compound (Hg_2Cl_2), was popular during the 16th–19th centuries in treating several human illnesses. Calomel (literally means 'good' and 'black' [from Greek]; it will turn black in the presence of ammonia) was used as a gastroenteric parasite cleanser, and a powerful cathartic and a purgative. Early medical practitioners thought that calomel was useful as a bowel cleanser, enabling the achievement of a metabolic balance. The physician–politician of America, Benjamin Rush (1746–1813) argued that calomel was a highly useful medication to treat human mental imbalances¹⁰. The notoriety of calomel in that period can be read in Kang and Pederson¹¹. JA was attracted by the usefulness of calomel, then seen as a panacea, and tried it in 'scruple doses' (note 6) for treating cholera in Madras. He experimented with calomel in different combinations: for example, with dilute nitric acid and with mild tartaric acid. He was convinced that dilute tartaric acid + calomel worked efficiently in draining the cystic bile (that flows through the duct which joins the gall bladder and the common bile duct) helpfully by dissolving the 'dark-grey dejections'. What JA means by 'dark-grey dejections' is not clear. Perhaps he means the 'agents' that induced cholera. According to him, calomel separates the viscid matter and produces the dark-grey dejections, which is a predisposition to recovery of patients suffering from cholera.

In the second part of the same volume, he delineates the prevalence of other infectious diseases of India and relates them to geography and climate, and how these abiotic factors influence the biological constitutions of Westerners living in India.

Remarks

Suśruta Samhitā – an ancient Indian medical text – indicates a violent diarrhoea as Viśuṇika¹², broadly meaning a stomach, intestinal disturbance. However, the Orientalist Horace Wilson¹³ (note 7) describes Viśuṇika as spasmodic cholera.

Cholera has been present in the Madras Presidency long before JA's experience of dealing with it. At an intense scale, the Madras Presidency experienced cholera in Arcot (presently Vellore district, 12°99'N, 79°31'E) in 1787–1789; it was also reported from Ganjam (19°38'N, 85°05'E) in 1790, and along the Coro-

mandel (8–20°N, 80–82°E) in 1796 (ref. 14). This record includes details of cholera morbus coupled with spasms at the epigastrium. James Anderson, Physician-General at Madras, ordered that the letter from Maxwell Thompson (Surgeon attached to the 4th Regiment, European Infantry, Madras), which included details on the *post-mortem* examination of the viscera of a patient who had died of cholera, be circulated along with the notes made by Surgeon William Duffin, Head Surgeon, Vellore, and those by one Davis, Member, Medical Board, Madras (note 8). Further to this, Anderson also directed his medical staff in the Madras Medical Establishment to consider the remarks of the Dutch Physician Jacobus Bontius (Jacob de Bonti, 1592–1631), who practised in Batavia (presently, Jakarta, Indonesia) in the 17th century¹⁵. Bontius had suggested that the 'hot' bilious matter irritates the stomach and intestines resulting in copious discharges from mouth and anus; this is an acute disorder that requires immediate medical attention. The principal cause being hot and moist air, which generally included 'bluish-green' putrefying material that usually grows on fruits (note 9). According to Bontius, these bluish-green materials triggered the production of æruginous bile in humans, better known as miasmatics, wherein miasma means an oppressive, unpleasant atmosphere characterized by a nauseating vapour arising from rotting biological materials¹⁶. Charles Curtis¹⁷ (Surgeon-on-board, Medea Frigate, 1778–1805) in his travelogue elaborately describes cholera prevalent along the coastal hamlets of the then Madras (city), and has supplied some case reports pertaining to a few sailors, who had contracted the disease when Curtis halted in Madras (pp. 44–89). Among the notable names of Madras, Thomas Munro, Governor of Madras, died in Pallikonda (12°55'N, 78°56'E) because of cholera in July 1827 (ref. 18).

In 1818, seasons were markedly irregular and excessive rain occurred. JA mentions that 1818 – in terms of climate – was similar to 1817. According to him excessively heavy rainfall in Madras from July 1817 to January 1818, coupled with a great deal of thunder and lightning, followed by an intense hurricane in October triggered cholera. This observation makes some sense, since we know that cholera is a contaminated

water-borne disease; however, the rest need to be read with a grain of salt.

This contagious disease – occurring and spreading principally due to poor sanitary conditions – can inflict death in unattended patients, mainly because of dehydration. Before the 1820s, it was difficult to differentiate cholera from other diarrhoeal diseases. The earliest record of cholera breakout pertains to 1817, the subsequent epidemics occurring in 1827 and 1829, spreading subsequently via trade routes, tourists, and army movements to many European countries and America¹⁹.

Medical diagnosis of cholera in the 17th and 18th centuries was made using features such as profuse watery and foul-smelling stools, associated with vomiting of clear fluids. Three names figure prominently in the chronology of the science of cholera: British surgeon John Snow (1813–1858), better known as an anaesthetist; Italian anatomist Filippo Pacini (1812–1883), and the German microbiologist Robert Koch (1843–1910). Snow clarified that cholera (i.e. cholera-inducing agents, although he did not specify what these were) multiplied within human systems and cholera spread via contaminated water. Pacini found hundreds of microscopic organisms in the intestines of the people who had died due to cholera, which he called the ‘vibrions’ (*Vibrio cholera*). After processing the organisms in water and saline solution, Pacini isolated the vibron, which he clinched as the causal agent for cholera. Koch was interested in the bacterium responsible for cholera; so he came to Calcutta in 1883 to gain first-hand knowledge of the disease²⁰. In 1884, Koch announced that he had successfully isolated the bacillus in pure culture. The original binomial offered by Pacini (*V. cholera*) was amended as *Vibrio cholerae* (Proteobacteria: Vibrionaceae) in 1965 by the International Committee on Systematic Bacteriology. Koch confirmed that populations of *V. cholerae* living in the intestines and stools of victims were the causal agent of the disease, during his visit to Calcutta²¹.

Cholera seems to have been of deep interest among medical personnel in Madras and India until recent decades. Many have written on this dreadful disease. We will cite two examples here: Whitelaw Ainslie⁷ and Reginald Orton²² have written on the aetiology and management of cholera in Madras, almost at

the same time that JA published his volume. Orton subscribed to the climate and miasma theories of cholera as long as he was in India, but changed his subscription to ‘contagion theory’ on his return to England in the 1830s. Many of the remarks made by Annesley on his understanding of cholera are not tenable today: his linking to climate and miasmas, his interpretation of cholera linked to the nervous system are curiosity-provoking, from the historical perspective of the understanding an infectious disease.

The report of the Madras Sanitary Commissioner²³ for 1913, which also includes the report of the Sanitary Engineer for the same year, submitted nearly 100 years after JA’s work on cholera in Madras, highlights a few significant improvements made in the context of the mitigating damage caused by the disease in Madras. The number of deaths because of cholera had declined from 92,497 of earlier years to 37,730 in the report period. The Government of Madras had reserve parties of sanitary inspectors, who periodically visited different locations to census cholera sufferers and advise them appropriately on its management. Use of potassium permanganate (KMnO₄) was strongly advocated and the arms of the government generously applied KMnO₄ at appropriate doses ensuring safe water supply. A cholera dispensary was established by the Corporation of Madras in Tondiarpet (13°12’N, 80°28’E) in 1914, with a formal name ‘Infectious Diseases Hospital’, but popularly known as the ‘Cholera Hospital’. Today it functions as the ‘Communicable Diseases Hospital’. The note from this report²³ that the Government of Madras administered cholera vaccine to residents in Madras (numbers not available) is fascinating. The vaccine used, in high likelihood, should have been the Ferran vaccine for cholera developed in 1885 (note 10).

Today we know so much about cholera and its intensity of damage to human populations^{24,25}. For example, we know that the cell surface of *V. cholerae* includes the lipopolysaccharide O-antigen, which empowers us to recognize close to 200 serogroups, of which only O1 and O139 are responsible for the epidemic cholera. We also know that *V. cholerae* O1 is distinguished by two of its major virulence factors, cholera toxin (CT) and the toxin co-regulated pilus (TCP). CT is responsible for the diarrhoeal disease

coupled with severe water and electrolyte loss. TCP is vitally necessary for *V. cholerae* colonization of the small intestinal epithelium. In both classical and El biotypes within O1, genes get differentially expressed between the biotypes, particularly *in vitro* conditions²⁶.

In spite of such significant developments in the understanding of the science of cholera, we are struggling to effectively manage the disease even today. For instance, it still continues to be a major fatal disease in Africa and Asia. Close to 40% of cholera cases reported to the World Health Organization come from Africa, as against 93% and 98% in 2001 and 2009 respectively. Asia follows next with 38% and the Americas with 21% (principally Haïti, the Dominican Republic and Cuba)²⁷. There is a long way to go, before we can declare that we have won the battle over the dreadful *V. cholerae* and the illness it induces.

Notes

1. Substantial disparity in wages between British and Indian surgeons prevailed until India’s independence in 1947. This practice existed even among those Indians who had completed postgraduate training and earned the memberships and fellowships of different Royal Colleges of Physicians and Surgeons in the UK (e.g., M.R.C.P., F.R.C.S.). See, for example, Valerie Anderson’s²⁸ comment ‘Even though Eurasians outnumbered Europeans in India (2 : 1) throughout the nineteenth century, Europeans were recruited at around twice the rate of Eurasians’ (p. 240). However, we need to factor here that Anderson talks of Eurasians (presently Anglo-Indians) only. Indians were worse off than the Eurasians.
2. The Company of Surgeons (CoS), London, was established in 1745, cleaving the original organization, ‘the Company of Barber–Surgeons’ (established in 1540). The principal role of CoS was to register interested personnel as trainees to work with practising surgeons and to examine them at the end of their training. Between 1796 and 1799, CoS experienced administrative turbulence but managed to tide over it in 1800 and was rebranded as the ‘Royal College of Surgeons in London’. This transformed as the ‘Royal College of Surgeons of England’ in 1843 through a royal charter.
3. The Java Expedition, also referred as the Java Invasion, was a successful amphibious operation launched by the British in September 1811 in Madras. In 1748, the Madras Regiment was formed as a battalion

- with Stringer Lawrence as its commander. This regiment was also known as Madras Regiment Sepoys.
- The Madras European Regiment was formed by the English East-India Company in Madras in 1742, mainly consisting of European soldiers. Later this regiment came to be known as the 102nd Regiment of Foot (Royal Madras Fusiliers).
 - One guinea, valued slightly more in value than a British pound, was used in the 17th century Britain. Made of gold, it equalled 22 shillings. Because Guinea in Africa supplied the gold with which this coin was minted, it was popularly referred as the 'guinea'.
 - A 'scruple dose' was a measurement unit that equalled 1/24th of an apothecary's ounce. A scruple measured 20 grains, a dram (or drachm) measured three scruples, an ounce (apothecary's ounce, written in short form as 'oz.' deriving from the Italian term 'onza') measured eight drams, and a pound measured 12 ounces. In common parlance, a scruple dose also meant a 'small' quantity.
 - Horace Hayman Wilson (1786–1860) was a qualified physician, who worked in Calcutta, in the Bengal Medical Establishment. He was a passionate orientalist, who studied the languages and mythology of India. He was also interested in metallurgy and for some time was attached to the Government Mint in Calcutta.
 - Details of 'Davis' at the Madras Medical Board are not traceable. Crawford in his Roll of the Indian Medical Service 1615–1930 refers to one 'Thomas Davis' of the Madras Medical Board, under William Horseman (serial number 419, p. 285).
 - This must have been either *Penicillium italicum* or *P. digitatum* (Ascomycota: Eurotiales: Trichocomaceae), which generally grows on rotting fruits of citrus.
 - Jaime Ferran, a Spanish physician and an alumnus of the Louis Pasteur School in Paris, developed the attenuated vaccine for cholera in 1885, after growing *Vibrio cholerae* in culture media. He was the first in the world to vaccinate nearly 50,000 Spaniards, when a major cholera epidemic broke out there in Spain²⁹. From the 1990s, cholera vaccines are orally administered. Dukoral[®], for example, includes killed whole-cell material of *V. cholerae*-O1 in combination with a recombinant B-subunit of cholera toxin (CTB). This oral vaccine is supposed to provide 85–90% protection for the first six months, and subsequently requires a booster dose.
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